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THE

Municipality of George Town,

PENANG.

STRAITS SETTLEMENTS.

BUREAU OF HYGIENE & TROPICAL DISEASES
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27 JUN 1932

Health Officer's

ANNUAL REPORT

FOR THE YEAR 1931.

Price 50 Cents Per Copy.

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1932

THE CRITERION PRESS CO., LTD., Penang

226

27 JUN 1932

STATISTICAL SUMMARY

Situation	Lat. 5° 24′ N., Long. 100° 20′ E.
Average Elevation above L.W.M.O.S.T. ...	Town area 12 feet 6 inches Suburban area 25 feet 0 inch.
O. S. Tides rise and fall	9 feet 0 inch.
Rainfall 1931 (average of three readings within Municipal limits)	98.78 inches.
Mean Temperature 1931 (maximum and minimum readings)	82.68° F.
Maximum Temperature 1931 (recorded on February 27th and 28th and March 26th) ...	97° F.
Minimum Temperature 1931 (recorded on September 13th)	71° F.
Total area of Penang Island	108 square miles.
Area within Municipal limits	9.4 square miles or 5,845 acres.
Estimated population (mid-year)	149,964.
Density of population	25.66 per acre.
Crude death rate	24.74 per mille.
Infant Mortality	130.
Birth rate	35.44 per mille.
Sterling equivalent	2s. 4d.

STAFF OF THE HEALTH DEPARTMENT ON 31st DECEMBER, 1931.

G. S. GLASS	...	B.A., M.B., D.P.H., D.T.M. and H., Health Officer, Registrar of Births and Deaths, Deputy Superintendent of Vaccination, Registrar of Midwives, Medical Superintendent of Infectious Diseases Hospital, Medical Superintendent of Chinese Small-pox Hospital.
W. H. BRODIE	...	M.B., Ch.B., D.P.H., Deputy Health Officer, Deputy Registrar of Births and Deaths, Deputy Superintendent of Vaccination.
T. P. KHOO	...	M.B., B.S., (Hong Kong). Deputy Registrar of Deaths.

J. S. REUTENS	...	Chief Sanitary Inspector, joined the service	1st January,	1905.
H. L. McCULLOCH	...	Sanitary Inspector,	do. 1st January,	1912.
R. J. RANGEL	...	do.	do. 1st October,	1913.
OW LEONG CHYE	...	do.	do. 1st July,	1921.
M. D'SOUZA	...	Sanitary Sub-Inspector.	do. 1st April,	1919.
JOHN LOH	...	do.	do. 17th May,	1921.
E. V. LESSLER	...	do.	do. 1st July,	1921.
V. E. ROZELLS	...	do.	do. 1st September,	1921.
YEAP HIN TAT	...	do.	do. 14th August,	1922.
LIM KHAY SENG	...	do.	do. 1st March,	1923.
LO SIEW TEAN	...	do.	do. 1st July,	1923.
TEOH CHENG HOE	...	do.	do. 1st December,	1923.
M. S. d'ORVILLE	...	do.	do. 18th February,	1924.
OH CHENG GUAN	...	do.	do. 18th May,	1926.
LIEW AH FOO	...	do.	do. 20th May,	1926.
P. GAUTIER	...	do.	do. 6th July,	1928.
LIM TEIK GHEE	...	do.	do. 16th January,	1930.
REJAB bin OTHMAN	...	do.	do. 6th February,	1930.
LOW CHENG CHEOW	...	do.	do. 21st August,	1930.
OH CHENG LAN	...	do.	do. 1st November,	1930.

Miss H. FLINT	...	S.R.N., C.M.B., A.R.San.I., District Nurse, joined the service 1st May, 1928.
Miss F. M. SLOAN	...	S.R.N., C.M.B., District Nurse, joined the service 13th November, 1931.

Eight qualified midwives as part-time District Nurses.

MUNICIPAL HEALTH OFFICE,

Penang, 26th February, 1932.

To

The Municipal Commissioners.

Gentlemen,

I have the honour to submit the following report on the health of the Municipality during 1931.

1. Population.

The estimated mid-year population was 149,964. This figure is arrived at by the Registrar General's method of estimation, which is commonly adopted at Home, and probably the best available even here, where the census is less reliable.

The estimate for 1930 was 146,935, and our estimate for 1931, if the census had not been taken would have been 149,809.

The census was taken on 2nd April, most of our Inspectors working as Supervisors under the direction of the Deputy Health Officer.

The distribution of the population among the various nationalities is estimated, pending the issue of the full census report, as follows:—

TABLE I.

Nationality.	Males.	Females.	Total.	Per cent. of Total.
European	777	445	1,222	1
Eurasian	784	918	1,702	1
Chinese	61,453	41,368	102,821	69
Malay	9,821	9,991	19,812	13
Indian	17,861	5,094	22,955	15
Others	857	595	1,452	1
Total ...	91,553	58,411	149,964	100

2. Births.

There were 5,315 births registered of whom 2,698 were males and 2,617 females, the birth rate being 35.44 per thousand. The figures for 1930 were, births 5,630 and birth rate 38.32.

Reckoned on the estimated female population alone the birth rate was 90.99 per thousand compared to 98.37 per thousand in 1930.

The number of births and birth rates for the various nationalities were as follows:—

TABLE II.

Nationality.	Number of births.			Birth rate per thousand.	
	Males.	Females.	Total.	Total Population.	Female Population.
European ...	24	25	49	40.10	110.11
Eurasian ...	29	29	58	34.08	63.18
Chinese ...	1,966	1,933	3,899	37.92	94.25
Malay ...	313	283	596	30.08	59.65
Indian ...	335	342	677	29.49	132.90
Others ...	31	5	36	24.79	60.50

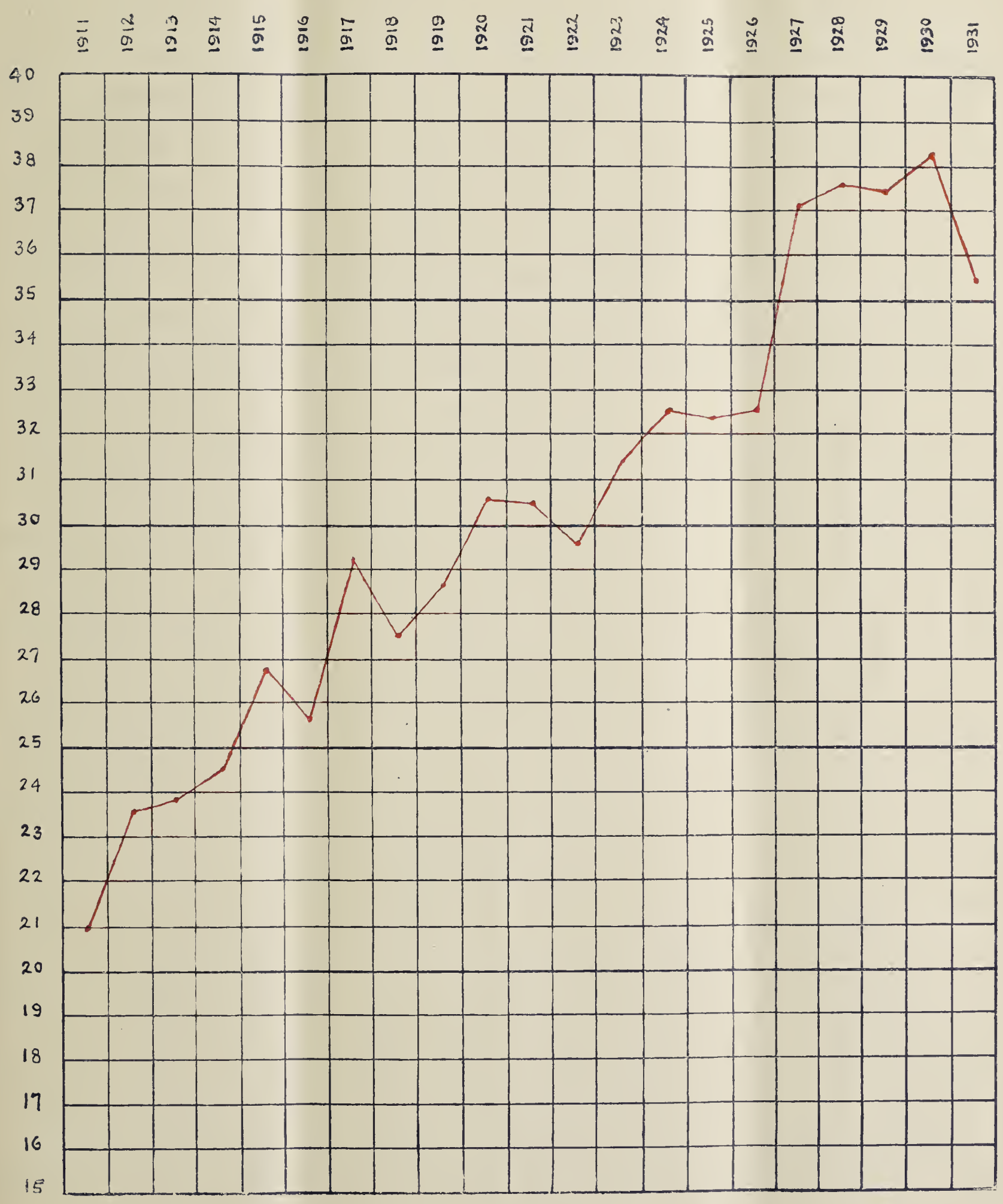
A comparison with the births registered during the previous ten years is shown here:—

TABLE III.

Year.	European.	Eurasian.	Chinese.	Malay.	Indian.	Others.	Total.
1921	48	71	2,623	557	437	32	3,768
1922	54	53	2,655	534	404	38	3,738
1923	59	53	2,818	573	499	26	4,028
1924	53	54	2,903	660	544	43	4,257
1925	46	52	3,135	562	497	26	4,318
1926	51	55	3,193	585	514	36	4,434
1927	61	75	3,714	638	631	33	5,151
1928	58	52	3,928	595	661	38	5,332
1929	45	48	3,970	663	656	28	5,410
1930	61	56	4,084	674	730	25	5,630
Average for ten years.	54	57	3,302	604	557	33	4,607
1931	49	58	3,899	596	677	36	5,315

PENANG MUNICIPALITY

BIRTH RATE



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A comparison of the births and deaths in the different nationalities may be of interest :—

TABLE IV.

Nationality.	Births.	Birth rate per thousand	Deaths.	Death rate per thousand
European ...	49	40.10	10	8.18
Eurasian ...	58	34.08	26	15.28
Chinese ...	3,899	37.92	2,244	21.82
Malay ...	596	30.08	451	22.76
Indian ...	677	29.49	489	21.30
Others ...	36	24.79	21	14.46

3. Deaths.

The gross total of deaths within Municipal limits during the year was 3,710 and crude death rate 24.74; of this number 469 were not normally resident in Penang and had been less than three months within Municipal limits. Omitting these we have 3,241 deaths and a corrected death rate of 21.61 per thousand.

The following table shows the distribution of the deaths in age groups and nationalities.

TABLE V.

Nationalities.	SEX.	AGES. Under 1 year.	1 to 5 years.	5 to 15 years.	15 to 25 years.	25 to 35 years.	35 to 45 years.	45 to 55 years.	55 to 65 years.	65 to 75 years.	over 75 years.	Unknown.	Total.	Grand Total.
European ...	M.	...	...	1	...	...	...	...	2	1	2	1	7	10
	F.	1	...	...	...	...	1	...	...	...	1	...	3	
Eurasian ...	M.	2	...	...	4	...	...	3	2	5	1	...	17	26
	F.	1	2	1	1	...	3	...	...	...	1	...	9	
Chinese ...	M.	268	157	48	89	157	175	192	149	104	28	2	1369	2244
	F.	230	117	63	63	93	82	72	64	59	32	...	875	
Malay ...	M.	49	28	10	18	26	26	16	25	22	14	...	234	451
	F.	35	26	8	25	30	14	12	35	17	15	...	217	
Indian ...	M.	62	33	10	18	52	50	42	38	17	9	2	333	489
	F.	40	21	5	20	26	14	11	6	10	3	...	156	
Others ...	M.	2	...	...	...	...	2	...	1	3	2	...	10	21
	F.	...	2	1	2	2	2	...	...	2	...	...	11	
Total ...	M.	383	218	69	129	235	253	253	217	152	56	5	1970	3241
	F.	307	168	78	111	151	116	95	105	88	52	...	1271	
Grand Total ...		690	386	147	240	386	369	348	322	240	108	5	3241	

Compared with 1930, the Chinese deaths have decreased by 1, the Indian deaths by 60 and the Malay deaths have increased by 42.

The total deaths of each nationality in the last ten years is shown here.

TABLE VI.

Year.	European.	Eurasian.	Chinese.	Malay.	Indian.	Others.
1922 ...	12	34	2,130	464	544	46
1923 ...	9	31	2,066	467	573	35
1924 ...	6	30	2,048	519	542	17
1925 ...	5	28	2,165	468	538	36
1926 ...	9	34	2,436	497	568	26
1927 ...	11	29	2,664	550	758	33
1928 ...	11	24	2,544	434	623	32
1929 ..	7	27	2,388	465	560	33
1930 ...	14	23	2,245	409	549	19
1931 ...	10	26	2,244	451	489	21

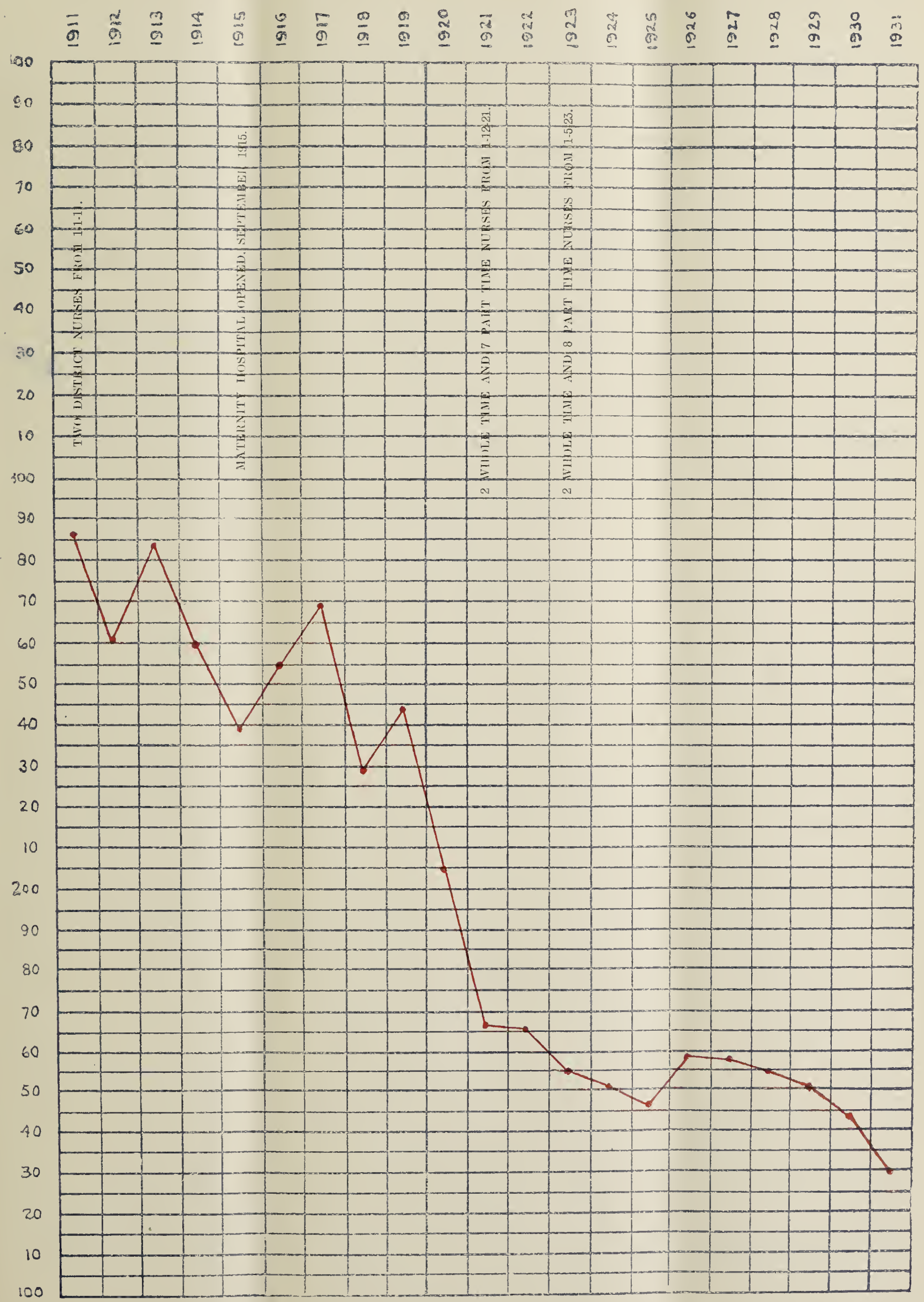
Appended is Table VII showing the infant mortality in the various nationalities and a comparison with 1930.

TABLE VII.

Nationality.	Births.	Deaths under one year.	Infant deaths per thousand births.	
	1931		1931	1930
European ...	49	1	20	16
Eurasian ...	58	3	52	54
Chinese ...	3,899	498	128	147
Malay ...	596	84	141	125
Indian ...	677	102	151	163
Others ...	36	2	56	120
Total ...	5,315	690	130	144

PENANG MUNICIPALITY

INFANT MORTALITY



NOTE:— Registration of births is believed to have been more accurate from September 1920

The chief causes of infant deaths and the mortality compared with that in previous years from the same causes are given in Table VIII.

TABLE VIII.

Disease.	Infant deaths per thousand births.									
	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Tetanus ...	2	8	4	0.5	0 23	0.19	0.38	0.37	0.18	0.94
Intestinal diseases ...	36	37	23	19	21	17	17	18	23	17
Respiratory diseases...	24	27	23	27	19	32	32	31	26	28
Prematurity & Debility	15	26	27	23	29	29	29	25	21	19
Convulsions ...	59	23	43	47	60	62	62	57	50	45

These causes accounted for 588 of the 690 infant deaths which occurred.

Five infants were certified as having died from tetanus and 241 were returned as having died from convulsions: the corresponding figures for 1930 are 1 and 282.

Table VIII is unreliable, the only figures that may be used with any exactitude for comparison are those shown in Table VII, and in the Infant Mortality chart.

Table IX is given below to show a comparisen between births, infant mortality and general death rate for the preceding ten years and for 1931.

TABLE IX.

Year.	Estimated population.	Births.		Deaths under 1 year.		Deaths at all ages.			
		Total.	Rate per thousand population.	Total.	Rate per thousand births.	Crude Total.	Corrected Total.	Crude rate.	Corrected rate.
1921* ...	123,300	3,768	30.56	631	167	3,775	3,313	30.61	26.87
1922 ...	125,834	3,738	29.71	622	166	3,768	3,230	29.94	25.67
1923 ...	128,300	4,028	31.39	626	155	3,801	3,183	29.62	24.81
1924 ...	130,810	4,257	32.54	641	151	3,811	3,162	29.13	24.17
1925 ...	133,373	4,318	32.38	634	147	3,858	3,240	28.93	24.29
1926 ...	136,000	4,434	32 60	705	159	4,396	3,570	32.32	26.25
1927 ...	138,635	5,151	37.15	816	158	4,860	4,045	35.05	29.18
1928 ...	141,348	5,332	37.72	826	155	4,670	3,668	33.04	25.95
1929 ...	144,114	5,410	37.54	815	151	4,126	3,480	28.63	24.15
1930 ...	146,935	5,630	38.32	809	144	3,939	3,259	26.81	22.18
Average for the preceding ten years.	134,865	4,607	34.16	713	155	4,100	3,415	30.40	25.32
1931* ...	149,964	5,315	35.44	690	130	3,710	3,241	24.74	21.61

*Census year.

4. Cause of Death.

Table X shows the age, sex and cause of death certified: 1,408 of the certificates were from Hospitals and Private Practitioners, 45 from the Coroner and 1,788 or 55.17% of the total from the Deputy Registrar of Deaths.

In other words less than half of the cases were under medical attention before death. As the number of post-mortem examinations made was so small as to be negligible the diagnoses here tabulated must be accepted with reserve.

Since the year 1921, the Deputy Registrar of Deaths has been instructed to use the term "Unspecified Fever" for the cause of death, where the information obtainable does not seem to warrant a more definite diagnosis.

DEATHS	SEX	AGES											Total	Grand Total
		Under 1 year	1 to 5 years	5 to 15 years	15 to 25 years	25 to 35 years	35 to 45 years	45 to 55 years	55 to 65 years	65 to 75 years	over 75 years	Unknown		
Small pox ...	M.	1	...	...	1	1	1	...	...	...	...	..	4	5
	F.	...	...	...	...	...	1	...	...	...	...	...	1	
Enteric fever ...	M.	...	1	2	4	5	4	...	...	...	...	...	16	25
	F.	...	...	3	2	2	...	2	...	...	...	...	9	
Diarrhoea ...	M.	33	31	2	...	4	1	2	1	3	...	...	77	116
	F.	18	11	...	2	2	...	1	3	...	2	...	39	
Dysentery ...	M.	2	...	2	5	3	6	7	9	3	1	...	38	58
	F.	1	2	2	3	2	2	1	3	4	...	...	20	
Remittent fever ...	M.	...	2	...	...	1	1	...	...	...	...	..	4	4
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Intermittent fever ...	M.	...	1	...	...	...	...	...	...	...	...	...	1	1
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Unspecified fever ...	M.	31	41	21	25	30	30	35	22	3	...	...	238	427
	F.	21	47	19	29	31	13	17	10	2	...	...	189	
Syphilis ..	M.	4	1	1	2	3	7	9	5	1	...	1	34	48
	F.	7	...	...	2	...	1	2	2	...	...	...	14	
Pnerperal fever ...	M.	...	...	...	...	...	...	...	...	...	...	...	...	15
	F.	...	..	...	6	8	1	...	...	...	...	...	15	
Other septic diseases...	M.	7	2	...	4	4	11	8	5	5	...	...	46	80
	F.	8	1	3	3	7	6	1	2	2	1	...	34	
Phthisis ...	M.	...	1	1	33	76	87	60	29	11	2	...	300	420
	F.	2	3	4	15	40	31	16	7	2	...	...	120	
Other tubercular diseases ...	M.	...	2	1	2	3	...	...	1	...	...	...	9	14
	F.	...	...	2	3	...	...	...	...	...	...	...	5	
Leprosy ...	M.	...	...	...	...	...	...	...	...	...	...	...	...	3
	F.	...	...	...	1	1	1	..	...	...	...	...	3	
Tetanus ...	M.	3	...	3	...	1	1	...	...	...	...	..	8	11
	F.	2	1	...	...	...	...	...	...	...	...	...	3	
Diphtheria ...	M.	...	2	1	...	...	...	...	...	...	...	...	3	9
	F.	...	2	3	...	...	...	...	...	1	...	...	6	
Influenza ...	M.	...	...	...	...	...	1	1	...	1	1	...	4	14
	F.	2	2	...	1	1	1	...	3	...	...	...	10	
Totals to carry forward	M.	81	84	34	76	131	150	122	72	27	4	1	782	1250
	F.	61	69	36	67	94	57	40	30	11	3	...	468	

DEATHS.	SEX	AGES											Total	Grand Total
		Under 1 year	1 to 5 years	5 to 15 years	15 to 25 years	25 to 35 years	35 to 45 years	45 to 55 years	55 to 65 years	65 to 75 years	Over 75 years	Unknown		
Brought forward	M.	81	84	34	76	131	150	122	72	27	4	1	782	1250
	F.	61	69	36	67	94	57	40	30	11	3	...	468	
Malaria ...	M.	1	5	1	12	14	9	9	3	...	1	...	55	72
	F.	...	1	4	3	4	1	1	3	...	...	...	17	
Malarial cachexia ...	M.	...	1	...	..	...	...	1	...	...	...	...	2	2
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Worms ...	M.	...	7	2	1	...	...	...	...	...	...	...	10	19
	F.	...	7	1	...	1	...	...	...	...	...	...	9	
Measles ...	M.	...	...	1	...	...	...	...	...	...	...	...	1	3
	F.	...	1	1	...	...	...	...	...	...	...	...	2	
Rheumatism ..	M.	...	...	2	...	...	...	3	2	...	1	...	8	8
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Cancer ...	M.	...	...	...	1	...	2	3	4	4	1	...	15	33
	F.	...	1	...	...	3	3	7	3	1	...	...	18	
Anaemia ...	M.	...	1	...	...	2	...	1	1	...	...	...	5	10
	F.	...	...	...	...	2	2	1	...	...	...	...	5	
Beri-beri ...	M.	...	...	...	4	12	3	3	...	...	...	...	22	30
	F.	...	...	...	3	3	...	2	...	...	...	...	8	
Cerebro-spinal fever ...	M.	...	...	...	1	...	...	...	...	...	...	...	1	
	F.	...	...	...	...	...	...	...	...	..	...	...	...	
Premature birth ..	M.	42	...	...	...	...	...	...	...	...	..	...	42	64
	F.	22	...	...	...	...	...	...	...	...	...	...	22	
Old age ...	M.	...	...	...	...	...	...	...	37	60	37	...	134	237
	F.	...	...	...	...	...	...	1	23	44	34	..	102	
Convulsions ...	M.	132	43	2	...	...	...	...	...	...	..	...	177	316
	F.	109	24	5	1	...	...	...	...	...	...	...	139	
Other diseases of Nervous system	M.	...	1	3	1	7	5	5	2	1	...	...	25	45
	F.	3	1	1	4	7	3	...	1	...	...	...	20	
Organs of special sense ...	M.	...	...	...	...	...	...	...	...	...	...	...	...	3
	F.	...	3	...	...	...	...	...	...	...	...	...	3	
Circulatory system ..	M.	5	5	5	6	13	17	24	13	15	3	1	107	190
	F.	5	2	1	5	7	17	18	11	14	3	...	83	
Totals to carry forward ...	M.	261	147	50	102	179	186	171	134	107	47	2	1386	2288
	F.	200	109	49	83	121	83	70	71	70	40	...	896	

DEATHS.	SEX	AGES											Total.	Grand Total.
		Under 1 year	1 to 5 years	5 to 15 years	15 to 25 years	25 to 35 years	35 to 45 years	45 to 55 years.	55 to 65 years.	65 to 75 years.	Over 75 years.	Unknown.		
Brought forward	M.	261	147	50	102	179	186	171	134	107	47	2	1,386	2,282
	F.	200	109	49	83	121	83	70	71	70	40	...	896	
Bronchitis ...	M.	13	5	3	...	1	...	11	16	12	3	...	64	106
	F.	9	8	...	...	...	3	5	11	3	3	...	42	
Pneumonia ...	M.	36	23	5	10	23	11	18	8	8	1	...	143	231
	F.	26	21	13	10	5	4	2	1	3	3	...	88	
Other diseases of respiratory system	M.	33	28	6	10	10	12	9	16	8	2	..	134	226
	F.	34	21	10	5	6	7	3	3	2	1	...	92	
Enteritis ...	M.	17	9	1	...	2	3	5	...	1	...	...	38	68
	F.	17	6	...	...	3	2	...	...	...	2	...	30	
Diseases of liver ...	M.	1	...	...	...	1	7	6	5	1	..	...	21	29
	F.	2	...	...	1	...	2	3	...	...	...	...	8	
Other diseases of digestive system	M.	2	2	...	1	4	11	7	5	1	1	...	34	51
	F.	2	1	2	2	2	4	1	2	...	1	...	17	
Lymphatic system ...	M.	...	...	...	...	...	...	1	...	...	...	...	1	1
	F.	...	...	...	...	...	...	...	...	...	...	...	...	
Urinary System ...	M.	...	4	...	...	6	8	14	26	7	2	...	67	105
	F.	1	..	3	2	3	5	8	13	3	...	...	38	
Generative organs ...	M.	...	...	...	...	...	1	...	...	...	...	...	1	
	F.	...	...	...	2	4	1	1	...	...	...	...	8	
Child birth & abortion	F.	...	...	...	5	4	4	...	...	...	...	...	13	13
Bones & Joints ...	M.	...	...	1	1	...	...	...	...	...	...	...	2	3
	F.	...	1	...	...	...	...	...	...	...	...	...	1	
Accident & Negligence	M.	...	...	2	2	4	4	4	2	1	...	1	20	26
	F.	1	...	1	...	2	...	...	...	2	...	...	6	
Homicide, Suicide & Execution	M.	...	...	...	2	1	7	4	...	2	...	2	18	20
	F.	...	...	...	1	..	...	1	...	...	...	...	2	
Debility ...	M.	20	...	1	...	1	...	...	2	3	...	..	27	51
	F.	15	1	...	...	1	...	...	1	5	1	...	24	
Unknown ...	M.	...	...	...	1	1	1	...	...	...	...	...	3	4
	F.	...	...	...	...	...	1	...	...	...	...	...	1	
Diabetes ...	M.	...	...	...	...	2	2	3	3	1	...	...	11	16
	F.	...	...	...	...	...	...	1	3	..	1	...	5	
Total	M.	383	218	69	129	235	253	253	217	152	56	5	1,970	3,241
	F.	307	168	78	111	115	116	95	105	88	52	..	1,271	

A comparison between the number of deaths attributed to some of the principal causes in 1931 and in the preceding ten years is shown here.

TABLE XI.

DISEASE.	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	Average for preceding ten years.	1931
Phthisis ...	580	455	454	511	199	460	422	432	485	374	467	420
Pneumonia ...	220	266	222	188	276	349	413	312	300	249	279	231
Bronchitis ...	126	88	112	58	113	91	142	190	133	122	118	106
Malaria ...	420	134	101	52	97	134	147	168	103	89	144	72
Unspecified fever	116	504	524	589	659	809	767	413	435	400	522	427
Enteritis ...	186	73	97	9	35	42	36	35	44	62	63	68
Convulsions ...	124	244	106	202	218	318	438	424	380	360	281	316
Dysentery ...	115	108	75	81	58	89	87	94	42	49	79	58
Diarrhoea ..	115	147	166	157	125	144	149	154	157	158	148	116
Beri-beri ..	102	71	30	15	6	9	16	11	30	14	30	30
Debility ...	103	44	77	82	61	62	61	79	56	69	70	51
Tetanus	91	14	39	20	4	4	9	11	5	6	21	11
Old Age ...	173	203	274	302	287	211	293	290	242	255	253	236

The distribution of the chief causes of death among the various nationalities is shown in Table XII.

TABLE XII.

Certified cause of death.	European	Eurasian	Chinese	Malay	Indian	Others	Total
Diarrhoea	—	—	101	5	10	—	116
Dysentery	—	—	39	4	15	—	58
Unspecified fever	—	2	243	103	76	3	427
Syphilis	—	—	39	1	8	—	48
Other septic diseases	—	1	54	8	16	1	80
Phthisis	—	3	293	44	78	2	420
Malaria	1	—	53	5	13	—	72
Convulsions	—	—	232	60	23	1	316
Diseases of Circulatory system	1	2	140	25	20	2	190
Bronchitis	—	3	80	12	10	1	106
Pneumonia	—	1	168	15	45	2	231
Other Respiratory diseases	—	5	165	16	40	—	226
Enteritis	—	2	53	3	9	1	68
Diseases of the Urinary system	2	1	76	13	13	—	105
Debility	—	—	26	6	18	1	51

Details of certification are appended.

TABLE XIII.

Cause of Death.	Number certified by			
	Hospitals.	Private Practitioners.	Deputy Registrar of Deaths.	Coroner.
Enteric Fever	6	16	3	—
Diarrhoea	4	6	106	—
Dysentery	18	18	21	1
Unspecified Fever	11	54	362	—
Phthisis	170	60	189	1
Tetanus	8	2	1	—
Influenza	2	12	—	—
Malaria	31	30	9	2
Beri-beri	19	9	2	—
Old Age	5	10	221	—
Convulsions	4	58	254	—
Diseases of the Circulatory System	44	83	59	4
Bronchitis	4	16	86	—
Pneumonia	59	56	113	3
Enteritis	18	32	18	—

5. Seasonal Mortality.

The deaths and death rate for each month are here recorded.

TABLE XIV.

Month.	Deaths.	Death rate per thousand.	Month.	Deaths.	Death rate per thousand.
January ...	230	22.01	July	254	19.94
February ...	254	22.10	August	266	20.88
March ...	249	19.57	September	218	17.69
April ...	240	19.67	October	253	19.86
May ...	348	27.60	November	251	20.36
June ...	342	28.03	December	286	22.45

6. Infectious Diseases.

Table XV shows the incidence among the various nationalities of the principal infectious diseases which occurred during the year.

TABLE XV.

Nationality.		Small-pox.	Chicken-pox.	Enteric fever.	Tuberculosis.	Influenza.	Puerperal fever.	Diphtheria.	Measles.	Erysipelas.	Mumps.	Cérebro-spinal fever.	Total.
European ...	M.	...	2	1	...	...	...	...	1	1	...	...	5
	F.	...	...	...	...	...	...	...	2	...	...	...	2
Eurasian ...	M.	...	...	7	2	1	...	1	...	...	...	...	11
	F.	...	1	2	1	...	...	...	1	...	...	...	5
Chinese ...	M.	1	7	28	216	3	..	10	3	1	...	1	270
	F.	1	24	21	77	8	7	11	6	2	...	...	157
Malay ...	M.	5	10	7	28	1	..	1	..	...	...	...	52
	F.	4	...	3	16	2	7	...	...	...	...	..	32
Indian ...	M.	1	64	5	54	...	..	...	1	...	1	...	126
	F.	...	15	1	24	...	2	...	1	...	...	...	43
Others ...	M.	...	...	..	...	...	...	...	...	...	...	...	...
	F.	...	...	...	2	...	...	..	...	...	...	...	2
Total ...	M.	7	83	48	300	5	...	12	5	2	1	1	464
	F.	5	40	27	120	10	16	11	10	2	...	...	241
Grand Total ...		12	123	75	420	15	16	23	15	4	1	1	705

PENANG MUNICIPALITY

CRUDE DEATH RATE

7. General Progress in Public Health.

Table XVI shows the main figures for the last 23 years relating to births, deaths and infant mortality.

In earlier years the registration of deaths was more accurate than that of births, so, for purposes of comparison the Infant Morfality Rate which is still very high, is of more value than the other figures.

The total number of births in any population varies with the proportion of females of child bearing age to males. The birth rate of to-day therefore cannot be compared quite fairly with the figures of 22 years ago when there was a much smaller proportion of females. The registration of births was less efficient in those days than now.

Another factor to be borne in mind when comparing the data of this table is the difficulty of obtaining accurately the total of the female population.

A large mobile population many of whom never normally reside in Penang, and a hospital which caters for an extensive district beyond the Municipality, give rise to an erroneous impression when the crude and actual death rates are considered.

Our uncertainty of the actual population makes the death rate less valuable. This is exemplified in the sudden drop in the crude death rate in the census year 1921 due to previous underestimate of the population.

In spite of these meutal corrections the table shows that very definite improvement is being made.

TABLE XVI.

Year.	Total number of		Birth rate.	Crude death rate.	Infant Mortality.
	Births.	Deaths (crude)			
1909	1656	3923	16.15	38.25	337 (a)
1910	1905	3912	18.39	37.76	290
1911	2133	4045	21.02	39.88	287 (b)
1912	2421	3829	23.69	37.47	261
1913	2464	3794	23.95	36.86	284
1914	2545	3774	24.55	36.40	260
1915	2808	3390	26.89	32.46	239 (c)
1916	2708	3341	25.74	31.76	255
1917	3099	4071	29.25	38.42	269
1918	2940	4909	27.55	45.99	229
1919	3203	4466	28.86	41.54	244
1920	3321	4090	30.67	37.75	205
1921	3768	3775	30.56	30.61	167 (d)
1922	3738	3768	29.71	29.94	166
1923	4028	3801	31.39	29.62	155 (e)
1924	4257	3811	32.54	29.13	151
1925	4318	3858	32.38	28.93	147
1926	4434	4396	32.60	32.32	159
1927	5151	4860	37.15	35.05	158
1928	5332	4670	37.72	33.04	155
1929	5410	4126	37.54	28.63	151
1930	5630	3939	38.32	26.81	144
1931	5315	3710	35.44	24.74	130

NOTE:—

(a) 1st January, 1909—one District Nurse.

(b) 1st January, 1911—two District Nurses.

(c) September, 1915—Maternity Hospital opened.

(d) 1st December, 1921—two whole-time and seven part-time District Nurses.

(e) 1st May, 1923—two whole-time and eight part-time District Nurses.

It is thought that the Registration of Births became more accurate from September, 1920. This might account for much of the apparently sudden drop in Infant Mortality.

8. Registration of Births and Deaths.

The system of registration is simple and well carried out.

Notification may be made at any Police Station or Government Hospital or at the Municipal Office.

Deaths must be notified within twelve hours, or, on payment of a late fee within three days.

Births are notified within fourteen days, or, with late fee within forty-two days. Earlier notification might of course result in the saving of many lives through the efforts of our District Nurses, but unfortunately we cannot alter the law.

When the cause of death has not been certified by a registered medical practitioner, or by the Coroner, the Deputy Registrar of Deaths must make the best diagnosis he can on the information which he can elicit. This happened in 55.17 per cent. of the total.

9. Maternity and Child Welfare.

In this department the work has been carried on by Miss H. Flint and Miss F. M. Sloan, both whole-time District Nurses.

Two Municipal cars are kept for the use of District Nurses.

Eight locally qualified midwives were employed as part-time nurses, their work being house visitation.

The main part of the town is divided for this purpose into eight districts: to each district a midwife is allocated: each District Nurse superintends the work in four districts.

The total number of visits and revisits made by the District Nurses and the eight midwives was about 52,070.

At the end of the year 69 midwives were registered (under the Midwives Ordinance 1923) as Class "A", 180 as Class "B", and 14 as Class "C".

Class "C" are the local "bidans"—unqualified midwives—who were registered after the Central Midwives Board had certified that they possessed a competent practical knowledge of conducting midwifery cases.

The infant mortality for 1931 was 130.

149 babies died less than seven days old, and 33 between the ages of seven and fourteen days.

The following is the routine method of getting in touch with the mother and newly born child. When a birth is reported a Sanitary Sub-Inspector proceeds to verify or correct the address given. A daily list of the addresses is then given to the District Nurses who on the following day visit the houses to see what is required. If the case is already under medical supervision, we have no further responsibility.

In all other cases the District Nurses examine the baby and the mother. If there is not a registered midwife in attendance one of our part-time qualified midwives takes charge of the case for as long as may be necessary, the District Nurse revisiting as required.

Improper feeding of the baby must still be considered the greatest peril of the infant, and our Nurses spend much time trying to instil a better understanding of this subject; but it is an uphill task. Many parents often of the educated class, think that artificial feeding indicates a certain social standard and persist quite unnecessarily in giving the baby tinned milk mostly of the sweetened condensed variety and even more destructive luxuries.

The establishment of an Infant Welfare Clinic was again discussed, and many ladies expressed their willingness to give active voluntary assistance in the working of any such undertaking.

The Commissioners, however, decided that they could not give any financial support to the project.

10. Vaccination.

Public vaccination within Municipal limits is performed chiefly by our staff.

Our system of infant vaccination is the same as in recent years.

When a birth is reported, a Sub-Inspector proceeds to verify the address if possible, and gives advice as to vaccination and how to get free vaccination if desired.

After six months if the vaccination, or the removal from the town, or the death of the child has not been reported, the house is revisited and the parents reminded that vaccination is overdue.

Most of the vaccination is done on house to house visitation, by three of our Sub-Inspectors and the results are satisfactory: this method though it costs us a heavy expenditure in Inspector's time, seems the best practicable and worth continuing.

5,315 births were reported during the year.

Our staff did 5,641 vaccinations of which 2,817 were primary and 2,824 secondary. In addition Government vaccinators performed during the year 3,473 secondary vaccinations mostly in schools and private practitioners performed 1,160 primary vaccinations.

690 infants died under the age of one year of whom 629 were unvaccinated.

No serious results have been reported here from vaccination.

11. Water Supply.

There was throughout the year an ample supply of good drinking water, the average daily consumption being 54 gallons per head, including water used for trade purposes and shipping.

For a tropical town this seems a very large amount of naturally pure water which needs no boiling, filtering or other treatment to render it safe for drinking.

I notice that some people still endanger their health by the use of domestic filters or the more dangerous dripstone, probably they have been advised to use such things in other places and therefore assume that it is prudent to do the same here.

12. Anti-Mosquito Works.

At the beginning of the year our Indian labour force consisted of 82 coolies and 45 boys or "chokras".

The men were divided into four gangs, one of their number being appointed head man in each to supervise the others and not to do manual labour himself. In addition there were two gangs of oilers with eight and ten men in each, each gang working under a supervisor.

The working gangs were employed chiefly on making ditches, clearing and training streams and stagnant ditches, filling in pools and hollows, and cutting undergrowth, much of the work being done on so-called "reserve roads".

The boys, divided in three gangs of fifteen boys, each gang working under a supervisor, were most useful in collecting and where possible burying coconut shells, tins and other receptacles likely to be mosquito breeding places. They also do some minor oiling work.

Apart from the Health Officer's personal visits to these gangs, they were inspected and directed daily by the Sanitary Inspectors in whose districts they were working.

During the year some changes were made with the intention of securing better direction and control of the workers without increasing the cost.

The number of men was reduced to 64, divided into four gangs of 15, each under a head man and the number of boys was increased to 60 divided into five gangs of 12, each under a supervisor.

It is very encouraging to find an increasing number of people dispensing with the use of mosquito nets. This is no doubt the reward of careful supervision: for in houses from which complaints are received, we seldom fail to find mosquitoes breeding in the bath room, or under the ice chest, or in the containers under the legs of tables or even in the flower vases.

Malaria is not often acquired within our limits, but it must be remembered as a serious menace, since our most dangerous anopheline, A. maculatus is prevalent all along our border.

We have found it breeding within our limits in the Batu Lanchang area, Ayer Itam area, the Batu Gantong area, the Bagan Jermal area and in the Jelutong area near the Municipal boundary.

We have not found any other known malaria carrier.

Our commonest mosquitoes are various species of Culex.

A. subpictus var. malayensis is our most usual anopheline and has been found very widely scattered over the town.

A. barbirostris was found in the Batu Lanchang and Bagan Jermal areas.

During the year it was arranged that the Municipal Engineer should fill in the large swamp, approximately 8½ acres in extent, lying between River Road and Sungei Pinang Road.

The last recognized outbreak of malaria in this town occurred in 1919, when the Fort moat became infested with A. ludlowi, the mosquito having apparently arrived in some small boat which had anchored off that part of the coast.

As the River Road swamp is also tidal and equally exposed to invasion by A. ludlowi, it has always been a source of great anxiety to me, and although such invasion seems not to have occurred, it is satisfactory to see the danger being removed.

The filling-in is of course costly, no matter what material is used, and if refuse which has not been thoroughly incinerated is employed there is a great danger of nuisance arising both from smell and from the breeding of flies.

The nuisance can, however, be kept in check by the use of a sufficient quantity of crude oil, properly applied as has been done at River Road.

We used 57,000 gallons of "Graham's" anti-malarial mixture, the total cost of the oil during the year was $11,247.59.

The amount recovered from Government and from private owners for work performed by the coolies during the year was $1,663.00.

In spite of the apathy so often shown by residents here, the mosquito nuisance is very definitely less now than it was a few years ago, and the expenditure on mosquito control seems fully justified.

13. Permanent Anti-Malaria Works.

The special efforts to deal by measures of permanent value, as opposed to oiling, with certain ravines, streams and seepage areas on the north-western border of the Municipality, which had become invaded by A. maculatus owing to the denudation of a large part of the hill-side, was continued throughout the year.

We commenced this work in March 1930 with 12 men and a Supervisor, and in April 1930 increased the gang to 25 men, and later in the same month to 50 men with two head men and the Supervisor.

During 1931 our labour force was increased to 101 men with 4 head men in February, and to 129 men, 5 head men and two Supervisors in August, these latter figures represent the strength of the labour force at the end of the year.

Two important areas were dealt with during 1931, the Municipal quarry area towards the northern part of our boundary but south of Waterfall Road, and that part of Suffolk estate which lies between York Road and the Waterfall stream, behind the Eastern Smelting Company's property and York House.

In the quarry area, the large stream nearest Waterfall Road was put in 22 inch invert with sloping concrete sides for a distance of 1,220 feet.

Its tributary on the northern side was similarly treated for a distance of 672 feet, and a smaller tributary at the upper part of the main stream was dealt with up to 60 feet, a great deal of levelling and grading of the earth being required at this point.

The second main stream in the quarry area was more difficult, as it lay deeper and involved more work in grading the banks and also its course was very tortuous and required some straightening.

The total length of channel in this stream was eventually 1085 feet.

On Suffolk estate we buried all the ditches and streams in sub-soil pipes, laying 1832 feet of four-inch pipes, 1250 feet of six-inch, and 624 feet of eight-inch pipes.

These pipes led to two outlets to the Waterfall stream, and the Municipal Engineer constructed a strong retaining wall at each outlet.

The Municipal Engineer was frequently consulted on various matters connected with our work in the quarry area, and his advice was always readily given and acted upon.

14. Tuberculosis.

During the year, phthisis was given as the cause of 420 deaths, 230 being certified by Hospitals or private practitioners.

The corresponding figures for 1930 were 374 and 207.

The declared phthisis death rate is 2.8 per thousand, the previous four years showing 3, 2.99, 3.4, and 2.6 per thousand of the population.

Even if there is a genuine improvement, as suggested by the lower rates of the last two years, the position is most serious.

Ever since we adopted the policy of allowing the Deputy Registrar of Deaths to use the term "Unspecified Fever" when the available information is too meagre to admit of a more accurate diagnosis, I have feared that our actual phthisis death rate may be almost double the rate declared.

Phthisis is our commonest disease in Penang and the most likely cause of serious or persistent fever: and on the other hand, while many of our citizens suffer from malaria it is a disease not readily acquired within Municipal limits.

If then the majority of the 427 deaths attributed to "unspecified fever" were really due to phthisis, the death rate would be nearer 5 per thousand, an appalling figure.

I believe the true rate is not less than 4 per thousand, and we must suppose that the number of people suffering from the disease is much greater.

When the term "unspecified fever" was less freely used, the declared phthisis death rate was much higher, averaging about 5.76 per thousand in the ten years preceding 1922.

Apart from statistics, it is certain that housing conditions have vastly improved, and it is logical to believe that our phthisis rate, though far too high, is materially improving.

As tuberculosis is our most serious health problem, and is spread chiefly by housing conditions which allow insufficient light and ventilation and by overcrowding, we are engaged in a constant warfare against these two evils.

There are several methods of attack, of which I place first the regulation of Common Lodging Houses,—the most dangerous type of house.

We licensed 903 of these in 1931, and followed the usual practice of inspecting and supervising the cleansing of each house once a week.

This inspection seems well worth doing, although it involves a great deal of time and trouble. The usual fault we find is overcrowding, usually associated with dirty premises the weekly visit ensures a thorough cleansing and enables our staff to make a black list of the worst offenders.

This list is carefully revised when we do a night raid to get proof of overcrowding.

On our last night raid, at the end of 1931, we visited 145 Common Lodging Houses, and found gross overcrowding in 84, against the keepers of which we issued summonses and the Magistrate convicted them all and imposed fines amounting to $1308.

Overcrowding, however, pays well and will continue unless we greatly increase the frequency of our night raids.

Much improvement in domestic sanitation is obtained by the issue of Nuisance Notices and other notices. During 1931 we had 897 houses altered to suit our requirements as to light and ventilation, 119 under Nuisance Notices, and 778 under other notices.

The creation of new insanitary buildings and areas is checked by the examination of all building plans, with the exception of plans for Government buildings, first by various inspectors and finally by the Municipal Engineer and the Health Officer conjointly, before the plans are put before the Commissioners.

In houses where phthisis exists or has recently existed, our staff offer to attend to or assist in the disinfection of the premises and of such articles as may require steam disinfection.

When a patient suffering from phthisis is discharged from Hospital, the Medical Officer communicates to me the home address and the date of discharge, so that we may offer advice and assistance.

A leaflet has been prepared giving an outline of the routine which should be followed in a house where phthisis is present, and a copy of this in the appropriate language is left in such houses.

Some instruction on this subject is given by teachers in some of the larger schools, and this most important procedure will probably be continued and will have good results.

During the year the Inspector of Schools distributed copies of our leaflet, 8,000 in English, 8,000 in Malay (Jawi), 3,000 in Romanized Malay, 5,000 in Chinese, and 300 in Tamil.

The advisability of establishing here a tuberculosis clinic has been frequently discussed. If our high tuberculosis rate is due to our citizens being peculiarly susceptible to infection or to the climate or to rain-bearing winds, matters difficult to control, or if it is due to bad housing conditions and overcrowding, matters which we ought to control better, I am not convinced that the establishment of a clinic would solve our difficulty or that it would effect such an improvement in health as would justify the expenditure.

15. Small-Pox.

Fifteen cases occurred, of which six were fatal; three came from beyond our limits, and of these one died.

Unless modified by recent vaccination, the disease was of a severe type.

Of the fifteen, 10 had been vaccinated once and 7 recovered; one had been vaccinated more than once and recovered: 4 had no marks of vaccination and one recovered.

All the cases were reported in the first four months of the year.

16. Enteric Fever.

75 cases were reported: one was European, 9 Eurasians, 49 Chinese, 10 Malays and 6 Indians.

31 cases were treated in Hospital: 9 died and 22 recovered.

44 remained at home: 16 died and 28 recovered.

17. Chicken-Pox.

123 cases were reported, 102 of which were admitted to the Quarantine Camp.

Of the total 2 were Europeans, 1 Eurasian, 31 Chinese, 10 Malays and 79 Indians.

As usual the Indians showed a distinct susceptibility to this disease, the number affected being quite out of proportion to the size of the community.

18. Puerperal Fever.

16 cases were reported compared to 5 in 1930.

7 were Chinese, 7 Malays and 2 Indians: 15 died and 1 recovered.

19. Influenza.

Under Ordinance No. 157 (Quarantine and Prevention of Disease) this is classified as a dangerous infectious disease.

15 cases were reported, 1 was Eurasian, 11 Chinese and 3 Malays: 14 died and one recovered.

One case each was reported during the months of March, August and November, 2 each in April and July, 3 in June and 5 in May.

13 were notified by General Practitioners and 2 by Hospital.

20. Measles.

This infectious disease is not notifiable under Ordinance No. 157 (Quarantine and Prevention of Disease). Each year some cases come under our attention, but the disease has never assumed epidemic proportions.

15 cases were brought to our notice: 3 were Europeans, 1 Eurasian, 9 Chinese, and 2 Indians.

2 cases were treated in the Quarantine Camp: all recovered.

13 cases were treated at home: 3 died and 10 recovered.

Fortunately the disease is here not a prominent cause of death or disability, but the apparent difference in incidence and in mortality seems curious.

21. Erysipelas.

4 cases were reported: 1 was European and 3 Chinese. 3 were treated in Hospital and one at home: all recovered.

22. Mumps.

One case of Mumps, an Indian, was reported in May. He was treated at the Quarantine Camp and recovered.

23. Cerebro-Spinal Fever.

One case of Cerebro-spinal fever, a Chinese, was reported in November. He was treated at home and died.

24. Diphtheria.

Discussion having arisen on several occasions concerning the apparent increase in the incidence of Diphtheria, I took the trouble of looking up the available records, and tabulating the figures recorded (Table XVII).

Since it is incredible that the disease should show a one-hundred per cent. mortality in nine years out of the twenty-seven, we must conclude that before 1928 it was not generally the custom to notify mild cases or those which seemed likely to recover.

The chief cause of the apparent increase in incidence must be the better notification in recent years, as the increase in population cannot account for it, and if the disease had really become virulent or commenced to assume the proportions of an epidemic in 1930, we should have expected about 300 or 400 cases instead of 23 in 1931.

Even though we only have 9 deaths in a population of 149964, we cannot feel comfortable with such a dangerous and treacherous disease always present and threatening to become a serious outbreak.

I show here the monthly incidence (Table XVII).

TABLE XVII.

Month.	Cases Notified.	Deaths.
January ..	2	1
February ..	2	...
March ...	1	...
April ...	...	...
May ...	...	...
June ..	3	1
July ...	3	...
August ...	1	...
September ...	1	1
October ...	6	2
November ...	...	...
December ...	4	4
Total ...	23	9

TABLE XVIII.

Diphtheria in Penang Municipality.

	Estimated population (mid-year.)	Year.	Total cases reported.	Deaths.
	98,381	1905	1	1
	99,400	1906	...	...
	100,429	1907	3	1
	101,469	1908	4	2
	102,520	1909	1	1
	103,582	1910	4	2
Census (10th March)	101,182	1911	2	1
	102,167	1912	3	3
	102,913	1913	3	2
	103,664	1914	1	1
	104,420	1915	2	2
	105,183	1916	...	..
	105,950	1917	4	4
	106,723	1918	2	2
	107,502	1919	4	3
	108,286	1920	1	1
Census (25th April)	123,187	1921	5	4
	125,834	1922	4	2
	128,300	1923	4	4
	130,800	1924	4	2
	133,373	1925	8	6
	136,000	1926	6	5
	138,635	1927	8	5
	141,348	1928	15	5
	144,114	1929	11	5
	146,935	1930	20	10
Census (2nd April)	149,964	1931	23	9

25. Infectious Diseases Hospital, Perak Road.

121 patients, 30 healthy contacts and 7 observation cases were admitted.

Details of diseases and nationalities are shown in Tables XIX and XX.

TABLE XIX.

Disease.	Remaining on 31-12-30	Admitted.	Total.	Discharged	Transferred	Absconded	Died	Remaining on 31-12-31.
Small-pox ...	8	13	21	17	...	...	4	...
Chicken-pox ...	2	105	107	102	...	...	...	5
Measles ...	...	2	2	2	...	...	...	...
Mumps ...	...	1	1	1	...	...	...	...
Observation ...	...	7	7	7	...	...	...	...
Contacts ...	8	30	38	38	...	...	...	...
Total ...	18	158	176	167	...	...	4	5

TABLE XX.

Nationality	Remaining on 31-12-30.	Admitted	Total	Discharged	Transferred	Absconded	Died	Remaining on 31-12-31.
Eurasian ...	...	..	...	...	...	...	..	..
Chinese ...	1	24	25	24	...	...	1	...
Malay ...	8	34	42	40	...	...	2	...
Indian ...	9	96	105	100	...	...	...	5
Others ...	...	4	4	4	...	...	1	...
Total ...	18	158	176	167	...	...	4	5

There were five remaining in Hospital: they were Indians and all were suffering from Chicken-pox.

Of the 158 patients admitted, 19 presented themselves at the gate seeking admission, and the rest were brought by ambulance.

We have two motor ambulances, one of which is used for the conveyance of ordinary cases of infectious diseases and for work in connection with disinfection, and the other is kept for the conveyance of lepers.

This department is not concerned with the conveyance of accident cases for which separate ambulances are employed.

Our disinfecting station is placed beside the destructors, from which it derives steam.

The disinfector is of the Washington Lyontype, made by Messrs. Manlove, Alliot & Co.

We use also various liquid disinfectants, and in addition the Engineer's department makes free use of hypochlorite solution, produced by an electrolysing plant in their stores. 23,369 gallons were made during the year, the solution having an average strength of 4.5 parts of available chlorine per thousand and costing about 7 cents per gallon.

26. Markets.

We have one private general market, five public general markets, one public pig market and one public fish market.

The Municipal Engineer's Department is responsible for the sanitation of the public markets, and the importance and difficulty of the work are appreciated.

27. Theatres.

All theatres and cinemas were inspected once a week. The standard of sanitation remains good.

28. Medical Atendances.

Medical advice or treatment was given to Municipal employees 3,814 times.

The total for 1930 was 5,363 and for 1929 was 5,978.

The number seen per month varied from 227 in February to 426 in June.

The number seen in the different departments were:—

Engineer 2,487, Health 637, Electrical 100, Fire Brigade 68, Jinricksha 7, Water 395, Secretariat 100 and Veterinary 20.

29. Sale of Food and Drugs Act.

That milk which is sold here as fresh natural cow's milk leaves much to be desired both in purity and in cleanliness.

Some 5,173 lactometer tests were made by the Laboratory Assistant, and over 801 by the Sanitary Inspectors: 11 seemed to be below standard and samples of these were bought and analysed by the Deputy Government Analyst.

8 samples were found to be adulterated containing respectively, 6, 7, 7, 7, 10, 12 and 15 parts per cent. of added water.

The vendors were prosecuted: 8 were convicted during the year and fines were inflicted ranging from $20 to $100.

20 vendors were convicted on other charges: one for failing to carry his licence, one for failing to expose his badge, two for conveying milk in bottles other than the type approved by me, four for selling milk without licence and twelve for selling milk containing foreign matter.

212 milk vendors were registered during the year after medical examination.

The total amount of fines inflicted on milk vendors was $1,076.00.

30. Destruction of Rats.

In February 1929, the Commissioners were requested by the Colonial Secretary to arrange for all practicable measures for the destruction of rats to be enforced in the Municipal area.

However little the destruction of rats may affect the public health of Penang, I have always thought that it would probably be a sound economic proceeding, as the annual commercial damage done by rats must be great.

A special gang of seven coolies was detailed: they used direct slaughter after smoking out the runs, and to a less extent poison and traps.

By direct slaughter they accounted for 12,134 rats during the year.

31. Financial.

The total expenditure of the Health Department for 1931 was $161,669.53.

This includes the Quarantine Camp, the District Nurses Scheme, Vaccination, Anti-Mosquito Work, all pay and allowances and the Commissioners' donations to the Provident Fund of our staff.

The total receipts amounted to $18,791.22 leaving $142,878.31 as the cost of the department to the rate-payers.

This represents a rate of 2,033 per cent. or 4.879 pence in the pound sterling.

These figures are supplied by the Municipal Secretary.

The estimated population being 149,964, the total cost of the department for the year per head of population is about 95 cents or about two shillings and three pence sterling.

32. Staff.

Miss H. Flint went on home leave on 5th April and returned on 26th November.

Miss C. M. Gold was granted three months leave from 1st January prior to retirement owing to ill-health.

Miss F. M. Sloan was appointed District Nurse on 13th November, vice Miss C. M. Gold retired.

The following were engaged temporarily during the absence of our Nurses:—

Mrs. A. J. Batchelor from 12th February to 4th September.

Mrs. T. Mason from 7th April to 8th October.

Mrs. T. Y. Ogilvie from 5th September to 26th November.

The following appointments were confirmed:—

Mr. J. S. Reutens, Chief Sanitary Inspector, 6th February.

Mr. Ow Leong Chye, Sanitary Inspector, 6th February.

Mr. Oh Cheng Ian, Sanitary Sub-Inspector, 6th February.

Mr. T. W. Oxley, Supervisor, 12th August.

The following appointments were made:—

Ahmad bin Haji Ismail, Supervisor, 12th August.

A. de Mello, Temporary Supervisor, 12th August.

A. M. Gangadhar, Temporary Supervisor, 6th August.

Mohamed Shah bin Sutan Daik, Process Server, 18th August.

I wish to record my appreciation of the continued excellent work of the staff of this department.

I have the honour to be,
Gentlemen,
Your obedient servant,
G. S. GLASS,
Municipal Health Officer.

Penang, 29th February, 1932.

To

THE MUNICIPAL HEALTH OFFICER,
PENANG.

SIR,

I have the honour to submit the report of the work done by the staff during the year ending 31st December 1931.

General Sanitation.

The staff made 31,800 inspections and 43,671 reinspections, in which 1,499 premises were found defective and 1,964 dirty.

The following table shows how the notices were dealt with during the year.

Notices.	Outstanding on 31-12-30	Unserved on 31-12-30	New notices issued 1931	New notices served 1931	Unserved on 31-12-31	Complied with in 1931	Work proceeding on 31-12-31	Cancelled in 1931	Brought forward to 1932
Nuisance ...	92	...	183	181	2	157	13	...	116
Lime washing ...	17	2	450	452	...	436	17	...	33
Latrines ...	60	2	326	322	6	337	10	3	42
Drains ...	10	...	179	175	4	162	5	1	22
Filthy Premises ...	5	4	640	643	1	644	3	1	3
Common Lodging Houses ...	14	...	917	916	1	909	...	8	13
Trades ...	2	...	1123	1123	...	1122	...	...	3
Bakeries ...	...	...	983	983	...	982	...	1	...
Bylaws ..	32	3	429	432	...	443	2	4	17
Wells ...	26	1	41	40	2	42	1	...	24
Partitions ...	37	3	607	610	...	572	14	3	72
Mosquito Orders ...	64	6	293	297	2	298	28	5	58
Rats ...	...	...	72	72	...	68	1	2	2
Disinfection ...	...	...	564	564	...	559	...	5	...
Closing Order ...	14	...	35	35	...	40	...	...	9
Lodging House (Minor Offences Ordinance) ...	...	...	3	3	...	3	...	...	..
Total	373	21	6845	6848	18	6774	94	33	414

33 notices were cancelled for various reasons.

157 nuisance notices were complied with during the year. These dealt with 283 houses of which 119 were structurally altered to provide light and ventilation, 67 houses were generally repaired and 97 for other nuisances.

86 complaints were received and dealt with during the year.

Wells.

40 notices under Section 247, Ordinance No. 135 (Municipal), were served and 26 brought forward from 1930. 42 were complied with: 52 wells were closed.

Cemeteries.

The Sub-Inspector in charge visited the cemeteries 218 times.

Exhumations.

30 applications for exhumation of bodies were received, but only 28 bodies were exhumed under special licence.

Passengers.

351 passengers arrived from infected ports and passed through this office as against 162 last year.

Plans.

481 plans were sent in and examined in this office as against 463 last year.

Prosecutions.

704	summonses were issued during the year	654	convictions
100	were brought forward from 1930	26	withdrawn
		4	discharged
		120	carried forward
Total 804		Total 804	

56 Abatement of Nuisance, 10 Closing, 2 Ejectment and 46 Mandatory Orders were obtained.

The fines imposed by the Magistrates amounted to $6,079.50 against $5,001.11 last year.

Disinfections.

588 houses were disinfected during the year for the following causes:—

Phthisis	330
Diarrhoea	105
Enteritis	36
Dysentery	32
Chicken-pox	31
Enteric Fever	17
Diphtheria	12
Beri-beri	11
Small-pox	8
Cerebro-Spinal Fever ...	3
Measles	2
Puerperal Fever	1
Total ...	588

The houses disinfected being distributed as follows:—

Phthisis:—Hutton Lane (12); Dato Kramat Road (11); Chulia, Cintra, Campbell, Noordin and Bridge Streets (9 each); Macalister Road and Beach Street (8 each); Argyll, Magazine, Perak, Burmah and Siam Roads, and Carnarvon Street (7 each); Penang and Sungei Pinang Roads (6 each); East Jelutong, Macalister Lane, Rope Walk, Jelutong and Aier Etam Roads, and Kimberley Street (5 each); Western and Cantonment Roads, Queen, Armenian and McNair Streets, Caunter Hall, West Jelutong and Perak Lane (4 each); Batu Lanchang, Seang Tek, Patani and Transfer Roads, Market, Church, Cecil and Muntri Streets, and Prangin Lane (3 each); Jahudi, Anson, Irving, Dato Koyah, Maxwell, Brick Kiln, Kedah, Pahang and Gladstone Roads, Victoria, Malacca, Tek Soon and Acheen Streets, Aboo Sittee, Green, Kinta, Toh Aka, Chulia, Love and Stewart Lanes, Lorong Slamat, Kampong Java Lama, Claimant Place, Weld Quay and Kampong Malabar (2 each); Khoo Sian Ewe, Sri Bahari, Tanjong Tokong, Rangoon, Northam, Waterfall, York, Mount Erskine, Chowrasta, Phee Choon, Nagore, Clove Hall and Kuala Kangsar Roads, McCallum, Tye Sin, Hongkong, Ah Quee, Malay, Keng Kwee, King, Presgrave, Pitt and Katz Streets, Bagan Jermal, Soo Hong, Ceylon, New, Aboo Sittee, College, Bertam, Drury, Madras, Seck Chuan, Market and Amoy Lanes, Presgrave and Chulia Streets, Prangin Road Ghaut, North Beach, Green Hall, Kg. Java Bharu, Cannon Square, Malacca Court, Batu Gantong, Kampong Deli and Chin Ho Square (1 each).

Diarrhoea:—Jelutong Road (8); West Jelutong, East Jelutong and Perak Road (7 each); Bridge Street (5); Hutton Lane (4); Patani Road, Carnarvon and Noordin Streets (3 each); Prangin, Ayer Etam, Dato Kramat, Magazine and Macalister Roads, Chulia, Beach, Campbell, Kimberley, Malay, Tamil, Presgrave, Church and Cintra Streets, Green and Love Lanes, and Rope Walk (2 each); Siam, Maxwell, Trusan, Kuala Kangsar, Penang, Sri Bahari, Seang Tek, Kedah, Mt. Erskine, York, Batu Lanchang, Sungei Pinang and Brick Kiln Roads, Penang, Muntri, Katz and McNair Streets, Macalister, Aboo Sittee, Perak, Carnarvon and Soo Hong Lanes, and Bukit Dunbar (1 each).

Enteritis:—Bridge Street (5), Magazine Road and Toh Aka Lane (3 each); Campbell Street (2); Seang Tek, Brick Kiln, Dato Kramat, Gladstone, Argyll, Siam, Clove Hall, Timah and Chow Thye Roads, Acheen, Noordin, Armenian, McCallum, Kimberley, Chulia, King, Nanning and Tye Sin Streets, Hutton, Sungei Pinang and Singora Lanes, Prangin Road Ghaut and West Jelutong (1 each).

Chicken-pox:—Patani Road (16), Perak, Dato Kramat and Western Roads (2 each); Kuantan, Northam, Anson, Aier Etam, Ross, Pahang and Logan Roads, Kampong Java and Kampong Java Lama (1 each).

Enteric Fever:—Malay Street (2); Magazine and Transfer Roads, Toh Aka Lane and Presgrave Street Ghaut (1 each).

Diphtheria:—Prangin Road (3); Dato Kramat, Kuala Kangsar, Burmah and Magazine Roads, Beach, Malay, Cecil and Campbell Streets, and Lorong Slamat (1 each).

Beri-beri:—Perak Road (2), Magazine, Jelutong, Patani and Prangin Roads, Bridge and Pitt Streets, Prangin and Hutton Lanes, and Caunter Hall (1 each).

Small-pox:—Sungei Pinang, Perak, Jelutong, Halfway, Macalister and Brook Roads, Beach Street and Carnarvon Lane (1 each).

Cerebro-Spinal Fever:—Love Lane, Cintra and Kimberley Streets (1 each).

Measles:—Burmah Road and Cintra Street (1 each).

Puerperal Fever:—Cannon Square (1).

Trades.

The fees collected during the year for trade licences amounted to $9,102.30 against $9,128.70, a decrease of $26.40.

Common Lodging Houses.

903 common lodging houses were licensed during the year against 944 in 1930, the fees collected amounted to $1,664.40 as against $1,695.40, a decrease of 41 houses and fees $31.

One night raid was made in November. 145 houses were raided of which 124 had persons in excess. 84 summonses (including 32 cases heard in January 1932) were issued and fines amounting to $1,308 were imposed.

Lodging Houses under the Minor Offences Ordinance.

34 lodging houses were licensed under the Minor Offences Ordinance against 39 in 1930.

Milk.

212 milk-sellers were registered in 1931 as against 176 in 1930, an increase of 36.

The Sanitary Inspectors spent an afternoon each month in testing milk by lactometer from the various milksellers whom they met in different parts of the town.

801 samples were tested during the year by them and 5173 by the Laboratory Assistant.

11 samples which seemed to be below the standard were purchased and sent for analysis of which 8 samples were found to contain 6% to 16% of added water.

27 summonses were issued (8 for selling milk adulterated with added water and 19 for offences against the by-laws and regulations).

58 brought forward from 1930.

Total 85

28 convictions were obtained.

57 carried forward to 1932.

Total 85

Fines amounting to $1,076 were imposed against $490 in 1930, an increase of $586.

Vaccination.

Our vaccinators made 2,817 primary and 2,824 secondary vaccinations. 1,680 tubes of lymph were used at a cost of $420.

Private practitioners and public vaccinators made 1,156 primary vaccinations.

The Government vaccinator made 3,473 vaccinations within Municipal limits.

Rats.

Our gang of rat-catchers caught and destroyed 12,134 rats during the year by means of smoking, trapping and using of poison.

Anti-Mosquito Works.

Four anti-mosquito gangs did good work, cutting down vegetation, digging, levelling and clearing ditches in Reserved roads within Municipal limits; they also do works at the request and expense of owners. All streams including tributaries were cleared when necessary; and special attention was paid to the stream at the Chetty Temple during the Thaipusam festival.

Five gangs of chokras, each under a supervisor, were allotted certain areas to go through regularly once a week, and they were useful in collecting and where possible burying tins, coconut shells, and other receptacles.

The oiling gangs under supervisors regularly oiled all ditches, swamps and streams within Municipal limits and the Race Course, Kelawei Road, Bagan Jermal, Mount Erskine, Western Road, Waterfall Road and Scotland Road including the foothills to Kampong Bharu, Batu Gantong and foothills, Green Lane and foothills, Caunter Hall, Perak Road, East and West Jelutong and Jelutong Village, Bukit Dunbar, Perak Lane, Burmah, Anson, Larut, Gottlieb, Sungei Pinang, River, Patani, Jelutong and Batu Lanchang Roads; 37,000 gallons of "Graham's" anti-malarial mixture were used, the cost was $11,247.59.

At the request of some owners, oiling was done in private properties, the income received from such sources being $1,663.00.

Permanent anti-mosquito works in the nature of laying of subsoil pipes and concrete channel drains and filling in of marshy areas were carried out in the Municipal quarry area and Suffolk estate.

Staff.

The following appointments were confirmed:—

Mr. J. S. Reutens, Chief Sanitary Inspector, 6th February.

Mr. Ow Leong Chye, Sanitary Inspector, 6th February.

Mr. Oh Cheng Ian, Sanitary Sub-Inspector, 6th February.

Mr. T. W. Oxley, Supervisor, 12th August.

The following appointments were made:—

Mr. Ahmad bin Haji Ismail, Supervisor, 12th August.

Mr. A. de Mello, Temporary Supervisor, 12th August.

Mr. A. M. Gangadhar, Temporary Supervisor, 6th August.

The staff worked well throughout the year.

I have the honour to be,
Sir,
Your obedient servant,
J. S. REUTENS,
Chief Sanitary Inspector.

Prosecutions.	Brought forward from 1930.	Issued on 1931.	Cases in Court.	Convictions.	Withdrawn.	Discharged.	Abatement of Nuisance Order.	Closing Order.	Ejectment Order.	Prohibition Order	Mandatory Order.	Total Orders Obtained.	Fines.		Costs.	
													£	cts.	£	cts.
Nuisance Notice ...	10	55	60	60	...	...	56	2		...	...	58	64	00	30	00
Abatement of Nuisance Order ...	4	16	15	14	1	...	...	8		...	...	8	104	00	7	00
Latrines ...	...	31	31	31	..	...	...	...	..	...	27	27	...	...	15	50
Drains ..	...	5	4	4	...	..	...	...	...	...	3	3	...	...	2	00
Trades ..	...	47	47	47	..	...	...	...	...	...	...	...	282	00	23	50
Common Lodging Houses	1	93	90	81	8	1	...	...	...	...	...	...	1,142	00	40	50
Breach of C. L. H. By-laws	1	14	15	14	1	..	...	...	...	...	...	...	162	00	7	00
Filthy Premises ...	...	14	14	14	...	..	...	..	...	...	...	...	156	00	7	00
Sections 160/161 ...	1	32	33	32	1	...	...	...	...	..	16	16	127	00	16	00
Breach of Bakery By-laws	19	141	150	137	13	...	..	...	...	...	...	...	1,224	50	68	50
Breach of Milk Regulations	58	27	28	28	...	...	...	...	...	...	...	...	1,076	00	54	50
Failing to report birth ...	3	17	18	17	...	1	...	...	...	...	..	...	...	...	8	50
Breach of Pig By-laws ...	...	96	95	94	...	1	..	...	...	...	...	...	521	00	47	00
Breach of Cattleshed By-laws ...	...	2	2	2	...	...	..	...	...	...	...	...	18	00	1	00
Lime Washing ...	...	6	5	5	...	...	..	...	..	...	...	...	35	00	2	50
Mosquitoes ...	...	11	9	9	...	...	...	...	...	...	...	...	68	00	4	50
Unregistered Female Employee ...	...	1	1	1	...	...	..	...	...	...	...	...	25	00	...	50
Unregistered Midwife ...	...	2	2	1	...	1	...	...	...	...	..	...	50	00	...	50
Closing Order ...	3	2	5	5	...	..	...	...	2	..	...	2	...	...	2	50
Mandatory Order ...	...	1	...	...	...	...	...	...	...	..	...	...	...	..	...	...
Infectious Disease ...	...	4	4	4	...	...	...	...	...	...	..	...	210	00	2	00
Infringing Terms of C.L.H. Licence ...	...	84	52	50	2	...	...	...	...	...	...	...	776	00	25	00
Sale of Food & Drugs ...	...	1	1	1	...	...	..	..	...	...	..	...	...	...	10	50
Using N/Soil as manure ...	...	3	3	3	...	...	..	...	...	...	...	...	39	00	1	50
Total ...	100	705	684	654	26	4	56	10	2	...	46	114	6.079	50	377	50

Licenses issued in 1931.	No. 1930.	Fees. $	cts.	No. 1931.	Fees. $	cts.	No. Increase	Fees. $	cts.	No. Decrease	Fees. $	cts.
Coal Depot ...	5	60	00	5	60	00	...	...	...	...	...	...
Charcoal Depot ...	32	192	00	31	186	00	...	...	...	1	6	00
Wood Depot ...	83	498	00	68	408	00	...	...	...	15	80	00
Candle Factory ...	14	112	00	14	112	00	...	...	..	...	...	...
Braziers, Foundries & Smithies ...	54	108	00	50	100	00	...	...	..	4	8	00
Atap, Kajang and Straw ...	43	129	00	36	108	00	...	...	...	7	21	00
Cattleshed & Cow-house ...	83	367	00	79	329	00	...	...	...	4	38	00
Pig Sties ...	620	1240	00	622	1244	00	2	4	00	...	...	...
Stables and Horses ...	...	...	...	1	1	00	1	1	00	...	...	...
Sheep and Goats ...	8	19	70	11	30	30	3	10	60	...	...	...
Storing & Curing Hides ...	6	72	00	6	72	00	...	...	...	...	...	...
Soap Factory ..	11	88	00	15	120	00	4	32	00	..	...	...
Fish Storing and Curing ...	34	408	00	35	420	00	1	12	00	...	...	...
Rags, Bones & Feathers ...	5	60	00	5	60	00	...	...	...	...	...	...
Dyeing House ...	5	50	00	4	40	00	...	...	...	1	10	00
Drying Cloth ...	4	20	00	2	10	00	...	...	...	2	10	00
Tanneries ...	16	384	00	15	360	00	...	...	...	1	24	00
Blachan Factory ...	2	24	00	2	24	00	...	...	...	...	...	...
Sago Factory ...	1	10	00	1	10	00	...	...	...	...	...	...
Sugar Factory ...	12	72	00	12	72	00	...	...	...	...	...	...
Pepper Washing Factory...	1	10	00	1	10	00	...	...	...	...	...	...
Pottery Making ...	2	4	00	2	4	00	...	...	...	...	...	...
Market Gardens ...	89	...	...	96	...	...	7	...	...	...	...	...
Milksellers ...	176	176	00	212	212	00	36	36	00	...	...	...
Bakeshops ...	36	180	00	35	175	00	...	...	...	1	5	00
Cookshops ...	174	870	00	157	785	00	...	...	...	17	85	00
Eatingshops ...	752	3760	00	786	3930	00	34	170	00	...	...	...
Fresh Fish and Meat ...	43	215	00	44	220	00	1	5	00	...	...	...
Lodging Houses (Minor Offences Ordinance) ...	39	39	00	34	34	00	...	...	...	5	5	00
Common Lodging Houses...	944	1695	40	903	1664	40	...	...	...	41	31	00
Total ...	3294	10863	10	3284	10800	70	89	270	60	99	323	00